Direct Variation

1) The problems about the Exeter spring and the Canadian plains (#1-2 on T → G → E) contain relationships that are called *direct variations*. In your own words, describe what it means for one quantity *vary directly* with another. Which of the following describe direct variation?
   a. The gallons of water in a tub and the number of minutes since the tap was opened.
   b. The height of a ball and the number of seconds since it was thrown.
   c. The length of a side of a square and the perimeter of the square.
   d. The length of a side of a square and the area of the square.

2) To do a college visit, Wes must make a 240-mile trip by car. The time required to complete the trip depends on the speed at which Wes drives, of course, as the table below shows. Fill in the missing entries, and plot points on the grid provided. Do the quantities time and speed vary directly? It makes sense to connect your plotted points with a continuous graph. Explain why.

Mph	15	20	25			48		60		*r*
Hours		12		8	6		4.8		3	

3) Each of the data sets below represents points on a line. In which table is one variable directly related to the other? Why does the other table not represent a direct variation? Fill in the missing entry in each table.

x	*y*
0	4
4	10
10	19
16	

x	*y*
0	0
4	6
10	15
16	

4) (continuation) Plot the data from the tables in the previous question on the same set of axes and use a ruler to draw a line through each set of points. By looking at the graph, how could you recognize direct variation? What similarities and differences are there between the two lines drawn?

5) Which of the following pairs of quantities vary directly?
   a) the circumference of a circle and the diameter of the circle
   b) the distance traveled in two hours and the rate of travel
   c) the number of gallons of gasoline bought and the cost of the purchase
   d) the area of a circle and the radius of the circle.